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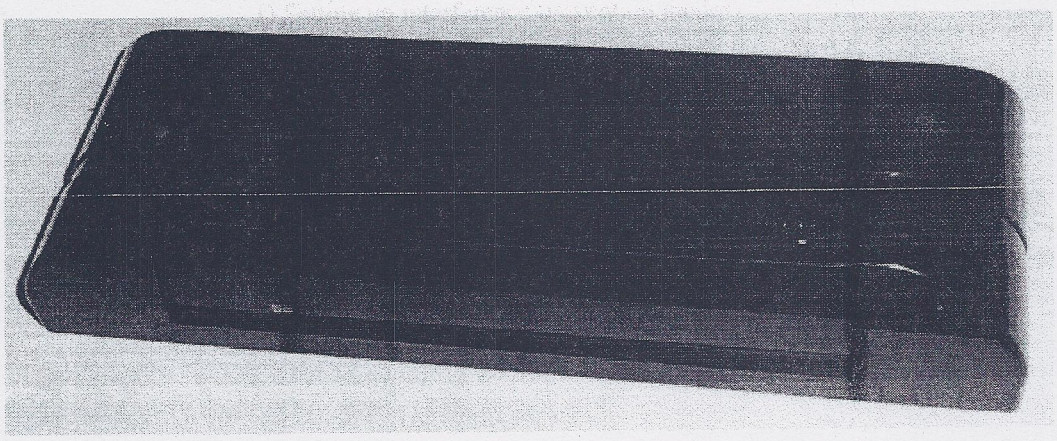
Instruction Manual
Acusensor 1B



WARNING

Do not install, operate or service this product unless you have read and understood the Safety Practices, Warnings, Installation and Operating Instructions contained in this manual. Failure to do so may result in property damage or bodily injury.

P/N 158911-B
August 25 , 2005 Revision

Instruction Manual

CAUTION:

The purpose of this manual is to familiarize the purchaser with the proper installation and operation of this system. It is essential that this equipment be properly installed and operational before the door is used by the public. It is your responsibility to inspect the operation of the entrance system to be sure it complies with any applicable standards. In the United States, ANSI Standard 156.10 and 156.19 usually cover the operation of the doors.

Instruct the building owners/operator on the essentials of the operation of the door and this device. The owner should follow these instructions to determine whether the door is operating properly and should immediately call for service if there is any malfunction.

All installation changes and adjustments must be made by qualified, NABCO trained technicians.

Contents

A. Specifications

Part Description	ACUSENSOR 1B
Part Number	# 14-8902-B
Sensing System	Active reflective infrared system (Motion / Presence)
Power source	12 to 24 VAC or DC Class 2
Recommended Temperature Range	-4 to 140°F (-20°C ~ +60°C)
Current consumption	70mA Max.
Output Contacts Rating	400VDC 0.12A Max. (Resistance load) [Semiconductor Relay] No Detection: "OPEN", Detection: "CLOSED", Power failure: "OPEN" In case of sensor malfunction: "CLOSED"
Mounting height	Max. 118" above detection area
Detection area (when mounted at the height of 118")	91" (2300mm) Width x 75" (1900mm) Max. Five position adjustment lever is available.
Area minute-adjustment	-4 to +4 degrees, at intervals of 1 degree by means of area minute-adjustment mechanism.
Output display	Waiting: Green LED Light, Transient: Amber LED Light, Detection: Red LED Light, In case of sensor malfunction: Red LED Blinks
Standstill memory time (learn time)	0 sec (Motion), 1.5 sec, 2 sec, 5 sec, 15 sec, 30sec, 90 sec, 300, sec and Forever detection (∞)
Output holding time	0.5 seconds
Weight	Approximately 1/2 lbs
Color	Black

B. Appearances and Dimensions

Figure 1 - Appearance

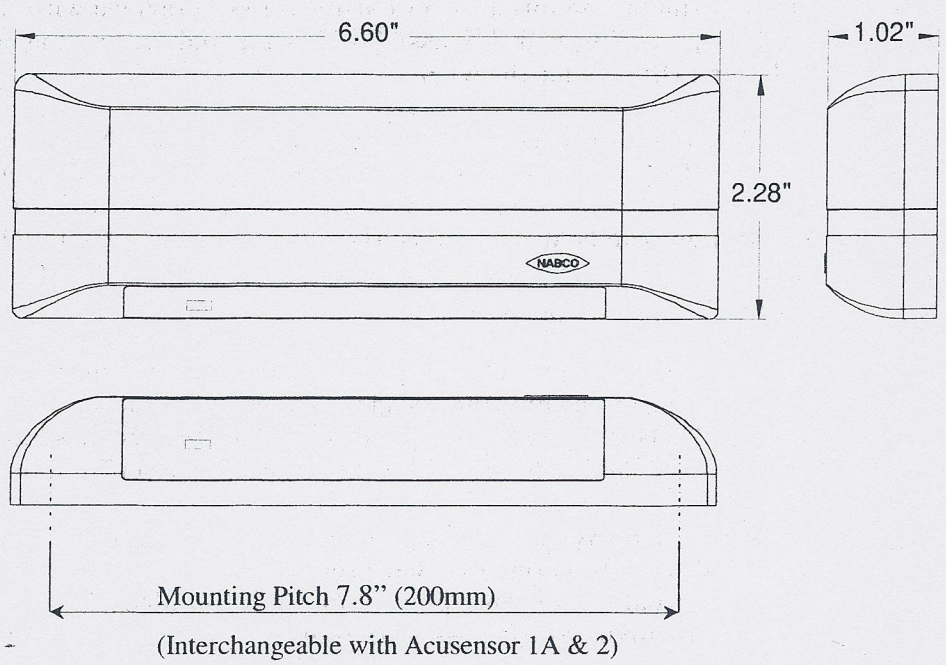
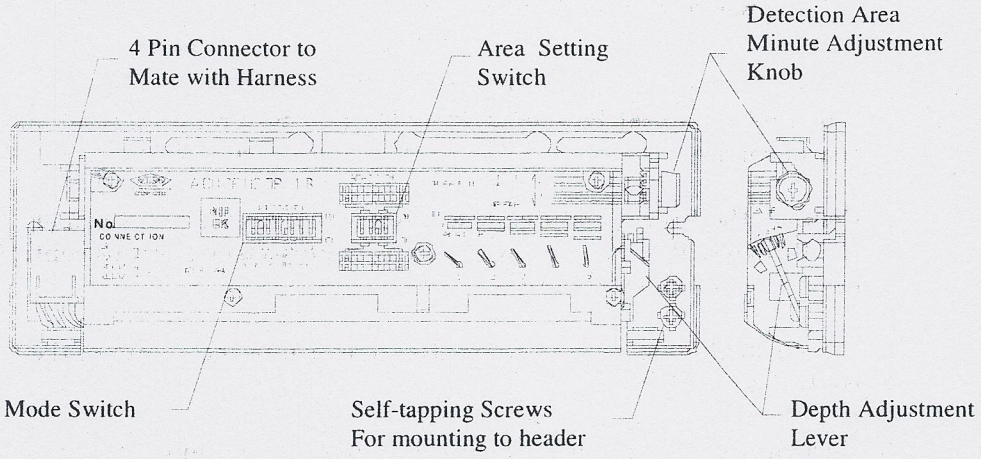


Figure 2 – Shown with cover removed



C. Installation and Adjustments

1. Installation

The Acusensor 1B is designed to be installed on an entranceway header or other similar mounting surface using screws provided with the unit. A drill template is provided to assist in locating and drilling the mounting holes and the hole for the wiring.

The Acusensor 1B will detect the areas directly below the mounting surface. If the mounting surface is not vertical or if it is necessary to move the minute-detection area in or out from the door *(refer to page 10)*, small shims can be used to make the necessary adjustments. The unit must be mounted such that it does not detect the door and still provide adequate threshold protection.

Under normal circumstances the unit will be mounted in the center of the door opening on the entrance header and up to 118 inches above the floor. It may also be mounted above the header. The dip switches have been preset at the factory for normal installation. These settings are:

Depth Coverage — Position 3
Minute Adjustment — 0 degree
Mutual Interference prevention Mode — Mode A
Sensitivity Setting — Standard
New Memory Timer — 15 seconds
Width Coverage — All seven zones

CAUTION: To prevent electrical shock, make sure that there are no electrical wires of other products in the area close to the place where you are going to drill.

2. Wiring

1. Plug the Acusensor Harness (#229184) into the 4 pin connector on the Acusensor 1B.

2. Connect the Brown and Red power wires to a class 2 transformer, the Brown & Red 12 volt wires on a Microprocessor U series control , or other suitable power source.

3. Attach the Yellow wires to the activation or presence input of the control box.

4. Turn on the power and wait three minutes for the sensor to calibrate.

Note: There cannot be any motion within the sensing zone during this time.

* The Acusensor 1B starts to operate within three seconds after the power switch is turned ON. However, if the light intensity reflected within the detection area is not sufficiently stable based on the sensor dip switch settings, the sensor will require the full three seconds to stabilize.

* To ensure that the presence detecting function operates properly, do not step in the detection area for about three minutes.

3. Turning ON the power

A. After installation and adjustments are completed, turn "ON" the power to the sensor, wait three minutes, then confirm the detection area.

B. If the sensor does not detect or misdetects, confirm the detection area and mode setting and re-adjust if necessary.

C. Turn "OFF" the power before executing the following procedures. If the following procedures are executed with power turned "ON", the sensor will keep detecting based on the time set for Presence Detection Time.

The doors could recycle or remain open indefinitely if the sensitivity is set to "High sensitivity" in the following conditions:

a. When adjusting the detection area or setting mode
b. When moving a mat within the detection area, such as when cleaning it.
c. When replacing a mat.
d. When moving things within the detection area or placing something new there.

CAUTION

Please confirm that the wiring is correct before turning "ON" the power. Turn power "OFF" before making adjustments to the detection area or setting the mode setting switch.

4. Customized Settings

The following information describes how to change the settings for depth of coverage, width of coverage, sensitivity and memory. Any changes to these settings that are made on site by the installer are the responsibility of the installer. Proper system operation must be verified according to ANSI Standard 156.10 and 156.19 or any local codes that apply to door operation.

a) Setting up for Depth Coverage

There are five options for the depth of coverage. The options are achieved by moving the position of the area lever on the side of the unit. Position 1 provides the least depth of coverage and option 5 provides the greatest coverage. Normally, maximum coverage is preferred. Depending upon how the Acusensor 1B is used, other settings may be suitable. Remember to turn off the power before making any changes. Changes will not take effect if the power is not removed.

As an Activation Sensor

When the Acusensor 1B is intended to be used as a door activating device, the depth of coverage should comply with ANSI requirements. To avoid dead zones under normal conditions, the depth lever on Acusensor 1B should be set to position #5, the sensitivity on Standard or High and the new memory timer for 300 seconds. This will give the maximum coverage with the greatest sensitivity and adequate time to sense slow moving pedestrians or objects.

As a Presence/Threshold Sensor Only

When other sensors are being used for the activation function, it may be desirable (but not necessarily required) to reduce the sensing coverage area of the Acusensor 1B. Adequate threshold or swing zone coverage might be achieved by setting the area lever to position #1 or #2. Coverage should always be checked to be sure it is adequate. For best detection of slow moving pedestrians or objects, the sensitivity option should be on Standard or High and the time set for 300 seconds.

The width and depth of coverage for an actual installation may vary from Table 1 & 2. This is typically the result of:

1. A variance in mounting height
2. Normal manufacturing and component tolerances
3. Variances in field measurements, procedures and conditions from ANSI standards.
4. Use of spacers for mounting

b) Non-Detection Zone

It is possible to have a non-detection zone in the sensing pattern. Figure 3 shows how changing the position of the lever affects the sensing pattern. White areas are non-detection zones.

In Position # 4, the non-detection zone is small enough that most objects will not go undetected. With the lever in Position #5, it is possible for small stationery objects to go undetected. However, if an object moves into one of the sensing zones the Acusensor will detect a change.

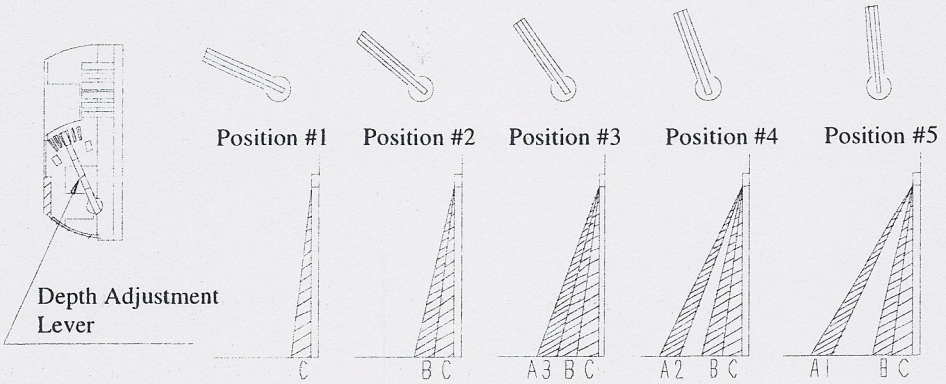


Figure 3 - Depth of coverage and Lever Position

	Lever Position				
Mounting Height	#1	#2	#3	#4	#5
84"	11"	23"	28"	47"	59"
118"	15"	30"	45"	60"	75"

Table 1 - Depth of coverage based on Lever Position

Note:
The above detection area dimensions are for reference only. Adjust sensor patterns to meet the specific requirements of the installation at hand.

c) Minute Adjustment of depth coverage

Adjust the minute setting to move the detection area in close to the doors. Adjust the detection area by sliding the minute area adjustment knob.

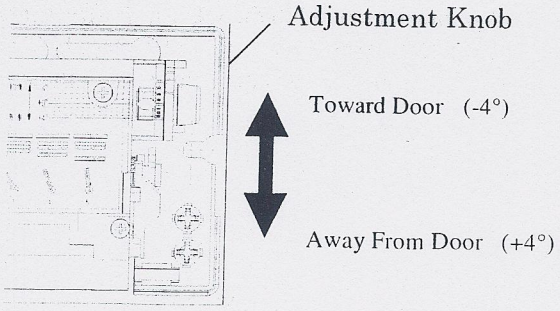


Figure 4 — Minute Adjustment

Note: Do not over tighten the adjustment knob

The direction where detection area is tilted toward the door is regarded as minus (-). There are 9 adjustment positions within the range between –4 to +4 degrees.

If the mounted height is 8 ft, each adjustment position (1 degree) causes the detection area to move about 2 inches.

The adjustment knob is factory set to 0 degrees.

CAUTION:

a. When detection area is tilted toward the door, the bottom edge of the header can block the sensor pattern if the sensor is installed too high on the header.

b. Do not use the adjustment knob to widen the detection area.

d) Adjusting for Width Coverage (refer to page 16)

The width coverage is achieved in seven increments as shown below. Up to six increments of detection width can be turned off; resulting in a reduction in coverage for the entire width. This may prove useful for the narrower openings on single slide or swing doors. All detection areas except Area 4 can be turned off (see Figure 5). Under normal conditions, all seven areas should be used. If any detection area zone is turned off, it will be necessary to check the detection area to be sure the correct ANSI Standard is achieved.

Note: Sensed areas are not true rectangles but rectangular approximations. Pattern size will be affected by surface color and texture.

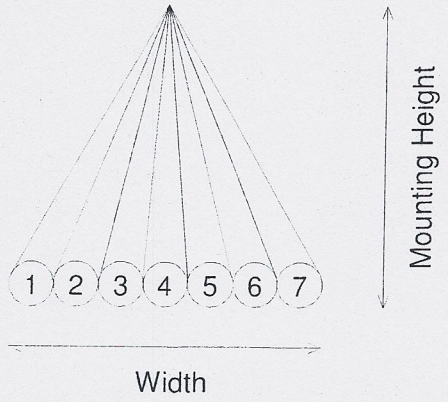


Figure 5 - Front view of Coverage Area Zones

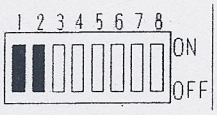
Mounting Height	Coverage Areas 1-7 Active	Coverage Width change per Zone Switch
84"	72"	10"
118"	91"	13"

Table 2— Overall Dimension of Coverage Area Zones

e) Operation Mode Set up

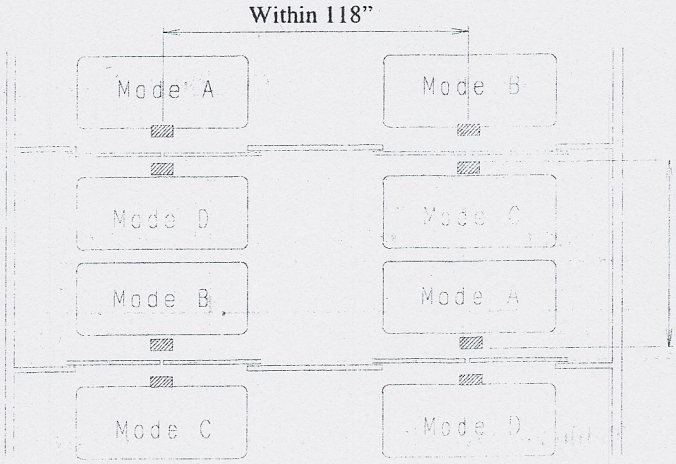
1) Mutual Interference Prevention Setting

Sensors placed close to each other should be set to different Interference Prevention Settings (Sensors that experience interference should be set to Modes A and D)



1	2	Mode
ON	ON	Mode A
ON	OFF	Mode B
OFF	ON	Mode C
OFF	OFF	Mode D

When multiple Acusensors are used in close proximity to each other (approximately 118 inches or less), such as in a vestibule, the use of different modes will help prevent mutual interference. Using the mode switch, four modes are possible through a combination of positions on switches #1 and #2. Following is an example of one combination which might be used in a vestibule.



Sensors facing each other should always be set to different modes

2) Sensitivity setting

Four sensitivities are available. High is the most sensitive setting. Snow is the least sensitive setting. Under normal circumstances the "standard" setting should be used. When adequate detection cannot be achieved, use a higher sensitivity. If the Acusensor activates unnecessarily, use the lower sensitivity. When low or snow sensitivity is used, care must be taken to assure that adequate sensing is maintained.

4	5	Sensitivity
ON	ON	Standard
ON	OFF	High sensitivity
OFF	ON	Low sensitivity
OFF	OFF	Snow mode

3) Presence detection time

The Acusensor computer will establish a base memory pattern of the total detection area when power is applied. Changes within the memorized detection area, whether on the floor or above the floor, will generate a signal to open the door. The base memory pattern will change automatically after the selected memory time set lapses when there is no movement within the detection area. The time interval at which these memory pattern changes will occur, can be adjusted using the dip Switches #6, #7 and #8.

6	7	8	Timer
ON	ON	ON	15 seconds
ON	ON	OFF	5 seconds
ON	OFF	ON	2 seconds
ON	OFF	OFF	Motion detection
OFF	ON	ON	30 seconds
OFF	ON	OFF	90 seconds
OFF	OFF	ON	300 seconds
OFF	OFF	OFF	Forever detection

Motion Detection (0 second) - If an object in motion stops, the Acusensor unit will cease sending an activation signal at that time. It retains that object in that position in it's memory immediately.

* *Forever Detection (Perfect presence)* - After initial setup, any new object in the detection area will cause the Acusensor to send an activation signal indefinitely until that object is removed from the area. It will never update it's memory on that object's location. This setting should be used where no changes in the detection area, other than door traffic, is anticipated.

f) Setting Width coverage

Adjust the pattern width to achieve proper detection area per ANSI

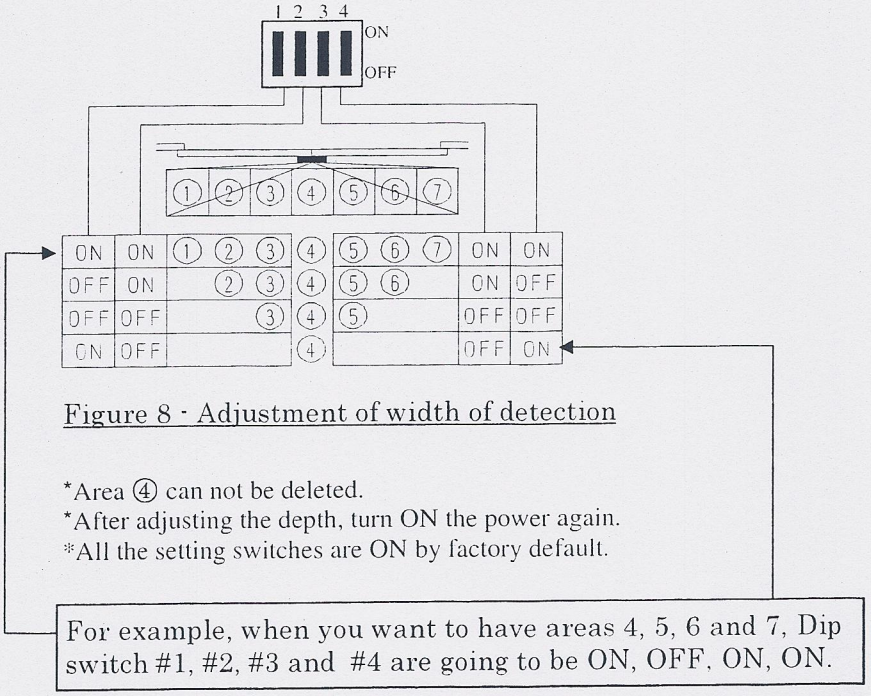


Figure 8 - Adjustment of width of detection

*Area ④ can not be deleted.
*After adjusting the depth, turn ON the power again.
*All the setting switches are ON by factory default.

For example, when you want to have areas 4, 5, 6 and 7, Dip switch #1, #2, #3 and #4 are going to be ON, OFF, ON, ON.

CAUTION: The Acusensor 1B emits active reflective infrared rays that detect the changing light intensity reflected from the floor surface in the detection area. The detection area is the reference area as determined by the Acusensor 1B. Detection sensitivities can vary depending on the color of the object being detected. Care should be taken to ensure the sensor is adjusted to reliably detect colored objects consistently.

Detection areas will fluctuate as the sensitivity is adjusted.

Be sure to confirm that the detection area is properly adjusted after any sensitivity adjustments are made.

5. Output

Output Indicator

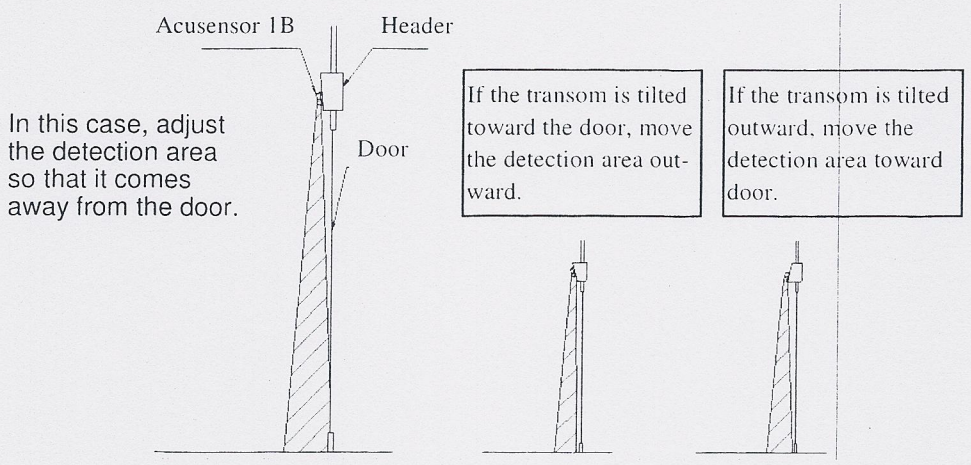
Condition	Power OFF	Power ON			
		Waiting	Transient	Detection	In case of trouble
Indicator	LED Off	Green	Amber	Red	Red LED Blinks

A LED shows the following conditions.

"Green" – Sensor detects no moving objects in detection area.
"Amber" – Transient detection.
"Red" – Infrared senses object in detection area.
"Blinks Red" – Sensor self diagnostics detects a problem. Detection is suspended.

6. Notice on usage

A. The Acusensor 1B is designed to provide a detection area as close to the door as possible for maximum coverage. If the Acusensor 1B is installed on a non-vertical surface, the door may end up inside the detection area. When installing the Acusensor 1B, adjust the detection area by the detection area minute-adjustment mechanism so that Acusensor 1B does not detect the door. (See page 10 in this Instruction Manual.)



Adjust the detection area by the detection area minute-adjustment mechanism so that it gets as close to the door as possible, regardless of the mullion shape.

B. Be sure to unplug the sensor first before changing the detection or mode settings (If the settings are changed when the power is ON, the Acusensor 1B may malfunction.)

C. Electric power consumption is 70mA at 12VDC per Acusensor 1B. Under low power conditions, the Acusensor 1B may malfunction. Be certain the power supply used is capable of supplying the necessary current required for all devices.

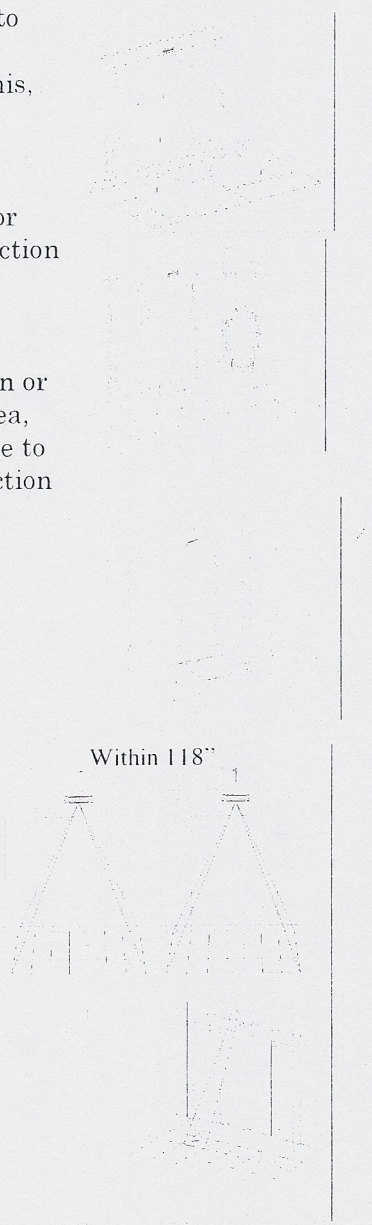
D. If you install an Acusensor 1B in a place where rain falls and puddles form, or excessive auto mobile exhaust or insects accumulate, the Acusensor 1B may malfunction. To avoid this, lower the sensitivity.
(See pages 13 in this Instruction Manual.)

E. If you have a short split curtain, flowerpot or any other items that may shake in the detection area, the Acusensor 1B may false activate. Move the items out of the detection area.

F. If a door mat is used on the floor, a shop sign or a shopping basket is put in the detection area, do not set the standstill object detection time to "forever detection". If the items in the detection area move a bit, the door may be held open.

G. If two or more Acusensor 1B's are used close to one another, ghosting may occur due to mutual interference. Be sure that every Acusensor 1B has a different mutual interference mode. (See page 12 in this Instruction Manual.)

H. Too much reflected light off the floor may reduce the sensitivity causing the Acusensor 1B to malfunction. Adjust sensitivity accordingly.



I. If the Acusensor 1B is installed in a place where rain or snow falls on it, damage to the sensor may occur. In this case, use Acusensor Rain Cover (P/N 14-10278).

If the background condition within the infrared detection area suddenly changes due to a strong snowstorm, the Acusensor 1B could ghost. In this circumstance, lower the sensitivity or choose the Snow mode. After the sensor is set to Snow mode, make sure the detection area is properly set. (See pages 13 in this Instruction Manual.)

7. Troubleshooting

Condition	Possible cause	Solutions
Does not work	Failure of power/lead wire	Check the wiring and connectors
	Abnormal power source	Check to ensure the correct voltage is being supplied to the of Acusensor 1B (12~24VAC/DC.)
Does not detect	Sensor filter is dirty due	Wipe the filter with a soft cloth with neutral detergent.
	Low sensitivity	Adjust for higher sensitivity using the mode switch.
	Detection area inappropriate	Adjust the detection area by area setting switch, depth adjustment lever and area minute adjustment function.
Misdetection	High sensitivity	Lower the sensitivity using the mode switch.
	Overlap of detection	Change interference prevention mode to be different from other sensors.
	Sensor detecting door	Confirm whether detection area is inclined toward the door. Adjust the detection area by area minute adjustment function.
	Moving object is within detection area such as a flag or a potted plant	Adjust detection area in order to avoid detecting the moving object or move the object out of the detection area.
	Detection area has changed	When the detection area changes from shopping carts being left in the doorway etc., the sensor will keep on detecting for the time set for presence detection time. Set presence detection time shorter using the mode setting switch.
LED indicator blinks red		Sensor self-diagnostics has detected a problem. Replace the sensor.
Presence detection time is short		Presence detection time may be short for three minutes after turning "ON" the power.

Questions?

Call Nabco Technical Assistance @ 1-866-622-8325